Risk in Context

Compare group rates, not just counts.

A1P.DSP.A.32 "Use mathematical and statistical reasoning with bivariate categorical data in order to draw conclusions and assess risk."

NAME _____ DATE _____

HIGHER RISK

The outcome rate in the first group is greater than the rate in the second group. Divide the number with the outcome by the total in each group.

Among 20 greenhouse seedlings, 6 wilted. Among 30 field seedlings, 3 wilted. The rates are 30% and 10%, so the first group has a higher rate.

LOWER RISK

The outcome rate in the first group is less than the rate in the second group. Compare rates rather than the numbers with the outcome alone.

Among 25 ceramic mugs, 2 chipped. Among 20 glass cups, 4 chipped. The rates are 8% and 20%, so the first group has a lower rate.

1 SORT

8 items

For each item, compare the outcome rates and circle HIGHER or LOWER for the first group.

1.	Among 40 bus riders, 12 missed a stop; among 20 train riders, 4 missed a stop.	HIGHER	LOWER
2.	Among 50 rented cars, 15 needed a repair; among 20 owned cars, 4 needed a repair.	HIGHER	LOWER
3.	Among 30 express shipments, 6 arrived late; among 20 standard shipments, 8 arrived late.	HIGHER	LOWER
4.	Among 25 afternoon flights, 10 were delayed; among 40 morning flights, 12 were delayed.	HIGHER	LOWER
5.	Among 80 messages with links, 8 were flagged; among 20 messages without links, 4 were flagged.	HIGHER	LOWER
6.	Among 20 players who practiced indoors, 3 were injured; among 40 who practiced outdoors, 8 were injured.	HIGHER	LOWER
7.	Among 60 books checked out for one week, 6 were returned late; among 20 checked out for three weeks, 4 were returned late.	HIGHER	LOWER
8.	Among 20 phones with cases, 6 had cracked screens; among 50 phones without cases, 10 had cracked screens.	HIGHER	LOWER

2 PROVE IT

Explain your thinking

Choose two numbered items, calculate both rates for each, and explain your choices.

ITEM # _____ **HOW I KNEW** _____

ITEM # _____ **HOW I KNEW** _____

3 MAKE YOUR OWN

One of each

Write one new example of HIGHER and one of LOWER, each with two group totals and the number in each group that had the outcome.

HIGHER

LOWER

CHALLENGE

Choose one numbered item and explain why comparing its rates does not prove that the group difference caused the outcome.

ANSWER KEY # Risk in Context

HIGH SCHOOL · A1P.DSP.A.32

PART 1 · SORT

#	ITEM	CATEGORY	WHY
1	Among 40 bus riders, 12 missed a stop; among 20 train riders, 4 missed a stop.	**HIGHER**	The rates are 12/40 = 30% and 4/20 = 20%.
2	Among 50 rented cars, 15 needed a repair; among 20 owned cars, 4 needed a repair.	**HIGHER**	The rates are 15/50 = 30% and 4/20 = 20%.
3	Among 30 express shipments, 6 arrived late; among 20 standard shipments, 8 arrived late.	**LOWER**	The rates are 6/30 = 20% and 8/20 = 40%.
4	Among 25 afternoon flights, 10 were delayed; among 40 morning flights, 12 were delayed.	**HIGHER**	The rates are 10/25 = 40% and 12/40 = 30%.
5	Among 80 messages with links, 8 were flagged; among 20 messages without links, 4 were flagged.	**LOWER**	The rates are 8/80 = 10% and 4/20 = 20%.
6	Among 20 players who practiced indoors, 3 were injured; among 40 who practiced outdoors, 8 were injured.	**LOWER**	The rates are 3/20 = 15% and 8/40 = 20%.
7	Among 60 books checked out for one week, 6 were returned late; among 20 checked out for three weeks, 4 were returned late.	**LOWER**	The rates are 6/60 = 10% and 4/20 = 20%.
8	Among 20 phones with cases, 6 had cracked screens; among 50 phones without cases, 10 had cracked screens.	**HIGHER**	The rates are 6/20 = 30% and 10/50 = 20%.

PART 2 · PROVE IT

Task: Choose two numbered items, calculate both rates for each, and explain your choices.
Accept any explanation that names the deciding feature from the rule box for the chosen item.

PART 3 · MAKE YOUR OWN (SAMPLE ANSWERS)

- **HIGHER**: Among 20 away volleyball matches, 8 ended in losses; among 30 home matches, 6 ended in losses. The loss rates are 40% and 20%.
- **LOWER**: Among 40 blue pens, 4 ran out of ink; among 20 black pens, 5 ran out of ink. The rates are 10% and 25%.

Challenge: In item 8, the cracked-screen rates are 30% for phones with cases and 20% for phones without cases. This does not prove that cases cause cracks because the groups may differ in how often their phones are dropped.

For Part 2, accept any two items supported by both correctly calculated rates. For the challenge, accept a specific reason the groups might differ besides the group characteristic being compared.